CATALOGUE

OF THE

Trustees, Officers and Students

OF

THE LEHIGH UNIVERSITY,

SOUTH BETHLEHEM, PA.

For the Year 1875-76.

WITH THE PLAN OF ORGANIZATION AND COURSE OF INSTRUCTION.

TUITION FREE.

BETHLEHEM, PA.:
D. J. GODSHALK & CO., PRINTERS.
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Faculty of the University.

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HENRY COPPÉE, LL. D., *Professor of English Literature, International and Constitutional Law, and the Philosophy of History.*

WILLIAM H. CHANDLER, Ph. D., F. C. S., *Professor of Chemistry.*

BENJAMIN W. FRAZIER, A. M., *Professor of Mining and Metallurgy.*

H. W. HARDING, M. A., *Professor of Physics and Mechanics.*

JAMES P. KIMBALL, Ph. D., F. G. S., *Professor of Geology.*

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AUGUSTUS JAY DUBOIS, C. E., Ph. D., *Professor of Civil and Mechanical Engineering.*

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SPENCER V. RICE, C. E , *Instructor in Graphics and Field Work.*

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WILLIAM D. MARKS, M. E., *Instructor in Mechanical Engineering.*

FRANK C. ANGLE, *Secretary to the President.*

E. P. WILBUR, Esq.
Secretary and Treasurer.

THE LEHIGH UNIVERSITY.

ORIGIN.

The Hon. Asa Packer of Mauch Chunk, during the year 1865, appropriated the sum of Five Hundred Thousand Dollars and suitable grounds in South Bethlehem, to establish an educational institution in the rich and beautiful Valley of the Lehigh. On this foundation arose the LEHIGH UNIVERSITY.

DESIGN.

The original object of Judge Packer was to afford the young men of the Valley a complete technical education for those professions which had developed the peculiar resources of the surrounding region. Instruction was to be liberally provided in Civil, Mechanical and Mining Engineering; Chemistry, Metallurgy and Construction, and in all needful collateral studies. French and German were made important elements in the collegiate course. Afterwards a School of General Literature was added to the plan, and tuition given in the ancient Classics, while the institution was freely opened to pupils from every part of the country and the world.

It is proposed, as soon as practicable, to establish various other technical professorships, and at the same time to develop and enlarge the Classical Department, and to have all the appointments of a complete University. Recently Sunday service has been opened in the College Chapel, and lectures on Psychology and the Christian Evidences are statedly delivered by the President. The Founder has just expended a considerable sum in the purchase of Books and Magazines, and has determined to erect, at a large expense, extensive Library and Chapel Buildings for the convenience of professors, students and citizens.

FREE TUITION.

It will be observed that all these educational facilities are provided without charge. Through the generosity of the Founder, the Trustees were enabled, in 1871, to declare tuition FREE in all branches and classes. Consecrated wealth has the rare privilege of scattering wide its bounties. The Lehigh University is open to young men of suitable talents and training from every part of our own land and of the world. We especially call to this fact the attention of the pupils of our public schools and of the graduates of classical institutions. They are offered, *without charge*, every facility for mastering the professions of the Civil, Mechanical and Mining Engineer, and of the Metallurgist and Analytical Chemist. FREE Classical instruction is also given, fully adequate to the needs of many who wish to become Lawyers, Clergymen, Physicians, Editors, or to pursue any distinctively literary avocation. Our venerable Founder has already had the satisfaction of expending for others more than a MILLION OF DOLLARS. He is still contemplating munificent additions to the Lehigh University, and only wishes that his bounty may be as FRUITFUL as it is FREE.

SITE.

Nothing is wanting in the situation of the Institution. The salubrity of the climate and the beauty of the scenery cannot be surpassed. Located in the midst of a region famous for its vast railway and manufacturing enterprises, near some of the richest iron and coal mines in our land, accessible to the great mechanical works, both of New York and Philadelphia, the students have rare facilities for confirming the teachings of the recitation room by the observation of the eye. The very atmosphere of the place is favorable to the growth of technical studies.

COMMUNICATION.

The University Buildings are about a half-mile from the depot at the junction of the Lehigh Valley and North Pennsylvania Railroads, thus affording the freest access East, West, North and South. New York is about ninety, and Philadelphia fifty-four miles distant.

BUILDINGS.

Packer Hall, named after the Founder, stands seven hundred feet back of Packer Avenue, at the base of the Lehigh Mountain. It is almost a model of beauty in architecture. Built entirely of handsome stone, it presents to the north a noble and imposing front. At the western extremity is a belfry tower containing the President's Room and the Archive Room. The eastern end is a large advanced wing in which are lecture and recitation rooms, and also a most extensive and complete laboratory. The central portion, eighty feet long, contains the present chapel, library and cabinets. To the right, within the grounds, are the houses of the President and Professors, comporting architecturally with the great hall. Towards the southeastern extremity stand Christmas Hall and Saucon Hall, commodious brick edifices erected as lodging houses for the students.

EXPENSES.

As before said, tuition is FREE in all branches and classes. Books, materials, paper, pencils, chemical materials used in the analytical laboratory, and instruments, are furnished by the student.

Rooms and board are provided in the University buildings under the following rules:

1. The amount of room rent, board, &c., for each term, must be paid in advance to the Treasurer of the Executive Committee, who will furnish the student with board ticket and key of room.

2. The charge for board and room-rent shall be $5 per week. Where two students occupy a room jointly, the charge shall be $4.50 per week for each.

3. The charge for board without room shall be $4 per week. The charge for room rent without board shall be $2 per week for each room.

4. These prices include gas and heat.

5. Meal tickets will be furnished by the steward to students or friends visiting them, at fifty cents each, payable in advance to the steward.

6. The choice of rooms shall be in the order of classes; in any class the first applicant to have the first choice.

7. Students may retain their rooms from year to year by giving notice of their intention so to do at the close of the academic year, and by procuring their tickets therefor on or before the first day of the next term.

8. Students are required to keep their rooms in order, or to employ some proper person to do so for them.

9. No furniture for rooms will be provided by the University.

10. The use of kerosene, coal oil or burning fluid in any of the buildings is prohibited.

DIPLOMAS AND CERTIFICATES.

The Diploma is given only to those who have passed the regular course in the classes and one of the Schools. For all partial courses a certificate is given of what the student has accomplished.

The fee for the Diploma on Graduation in any of the Schools is $10; payable before receiving it.

ADMISSION OF STUDENTS.

Applications for admission into the University should be made to the President, from whom all information may be obtained.

REGULAR STUDENTS.

All applicants for regular standing in the classes or Schools must be prepared to pass an examination according to the programme of studies. From this it will be seen that a student may be admitted at any time, if able to pass a satisfactory examination in the studies already pursued by his class.

PARTIAL STUDENTS

may enter, selecting such studies as they please, with the sanction of the President.

The arrangements for *partial students* have also special reference to young men who, from the force of circumstances, have not disposition, time or means for a full course, but who desire to gain, in a limited time, as much technical and practical knowledge as they can in a special department. Among these are many who, while obliged to labor daily, can only devote a small portion of their

time to study. Such are invited to come and learn what they can; and they will have such inducements presented to a continuance and increase of their studies as their earnestness, industry and proficiency may warrant.

CONDITIONAL STUDENTS.

Any young man who is partially, but not thoroughly prepared to enter in full standing in either class, may be admitted conditionally, to make up his deficiencies by extra study under the care of a professor or instructor. When they are made up he will be received into full standing in his class.

REQUIREMENTS FOR ADMISSION.

Applicants for admission into the first class must be at least *sixteen* years of age, and must present testimonials of good moral character. They will be examined in the following subjects:

Mathematics.—Arithmetic complete; Davies' new Bourdon's Algebra, through equations of the second degree; first four books of Legendre's or Chauvenet's Geometry.

English.—Correct spelling, to be determined by writing from dictation in idiomatic English; Mitchell's School Geography; Parker's English Grammar.

Latin.—For those students who design to pursue the course of General Literature, the Elements of Latin Grammar, with the Rules of Syntax; four books of Cæsar's Commentaries.

This examination will be rigorous, and no student will be permitted to enter in full standing who is deficient in these branches.

GENERAL PLAN.

The courses and subjects of study are set forth and arranged in the following manner:

THE FIRST THREE TERMS.

These are devoted, by all regular students, to the study of those elementary branches in which every young man should be instructed, for whatever profession or business in life he may wish to prepare himself, viz.: Mathematics, Languages, Elementary Physics, Chemistry, Drawing, History, Rhetoric, Logic, Declamation and Composition.

At the end of this time, having acquired the necessary knowledge, the student, following the bent of his own mind, and

aided by his parents and professors, will be ready to select some special professional course, to which all his studies and efforts will be directed. To enable him to do this, there are several technical schools which branch off from the end of the common course. In each the term of study is two and a half additional years, and the student, at his graduation in one of them, receives a special degree. By this means a young man is relieved from the oppressive and confusing study of those branches for which he has no taste, and pursues with cheerfulness the special course which he has selected, and for which he is suited by inclination and intelligence.

GENERAL COURSE.

STUDIES OF THE FRESHMAN CLASS—*First Term.*

Mathematics.—Chauvenet's Geometry, complete.

Physics.—Chemical Physics; Lectures.

English Studies.—Weber's Outlines of Universal History. Essays written extemporaneously under the eye of the instructor. Declamations in the Chapel.

Latin.—Review of Latin Grammar. Cicero's Epistles, Long's Edition.

Greek.—Greek Grammar: Goodwin. Exercise Book.

German.—Otto's Grammar, with Lectures. Writing in German Letters. Translation of German into English.

Geometrical Drawing.—Warren's Drafting Instruments and Operations. Elements of Industrial Drawing.

Second Term.

Mathematics.—Davies' New Bourdon's Algebra, complete. Plane and Spherical Trigonometry and Mensuration; use of Logarithmic Tables.

Chemistry.—Lectures on the Principles of Chemistry. Inorganic: Fowne's Elementary Chemistry.

Descriptive Geometry.—Warren's Elementary Chemistry.

Drawing.—The use of the Pencil and Pen in Free Hand Drawing. Geometrical Drawing.

English Studies.—Coppée's Elements of Rhetoric and Logic. Compositions carefully prepared. Declamations in the Chapel.

Latin.—Written exercises; Cicero continued.

Greek.—Greek Grammar, and Goodwin's Greek Reader.

German.—Otto's Conversation Grammar; continued. Translation of English into German. Exercises in Conversation.

STUDIES OF THE SOPHOMORE CLASS—*First Term.*

Descriptive Geometry.—General Orthographic Projections. Shades and Shadows. Linear Perspective: theory and plates.

Chemistry.—Lectures on Chemistry, with Laboratory Practice.

English Studies.—Lectures on English Literature. Compositions and Declamations.

Latin.—Livy, selections from Vols. XXI. and XXII.

Greek.—Felton's Greek Historians.

German.—Translation of English into German. Affinity of English and German. Exercises in Conversation.

French.—Translations from English into French. Resumé of the rules of Syntax. Copious exercises in French Idioms. Collot's French Grammar, with a course leading from the construction of easy sentences to composition and conversation. Chapsal's Littérature Française.

Geodesy.—Chain and Compass Surveying—Theory and Practice.

NOTE.—Students who intend to pursue the course of General Literature will not take Drawing, but will use the time in Latin and Greek.

THE SPECIAL SCHOOLS.

The following is presented as the general programme of instruction in these schools, subject to such modifications from time to time as the Faculty may deem expedient, with the approval of the Trustees:

REQUIREMENTS FOR ADMISSION.

Students who have passed successfully through the first three terms, may be admitted into any one of the Schools. All other applicants for admission into one of the Schools must pass a satisfactory examination on the subjects studied in the first three terms, and must be at least eighteen years of age.

I. THE SCHOOL OF GENERAL LITERATURE.

This School is intended to correspond, with certain important

differences, to the course long established in our colleges; and is open to those who expect to enter upon the study of Law, Medicine or Divinity, or to such as desire a general, rather than a technical education.

It should be observed that those who expect to enter it at the period of divergence—the middle of the second year—are required to study Latin and Greek from the date of their entrance into the institution. The ancient languages are then continued during the Junior year as required studies; and during the Senior year as elective studies, the alternates being Italian and Spanish, according to the choice of the student.

Great attention is paid to the study of French and German—languages and literatures. There is extended practice in English, French and German Composition. The earlier instruction in the modern languages being designed to enable the student to read intelligently; their further study, it is expected, will give him ease in speaking them, and means of a ready acquaintance with literary and philosophical works. He will thus have a comparative view of the entire field of modern literature.

The study of Mathematics in this School is limited to Algebra, Geometry, Trigonometry and Descriptive Geometry, as further progress in this branch is not deemed essential to the objects of the School.

The programme includes the courses in Physics and Chemistry, and a course in Theoretical Mechanics.

There is also a full course in the Science of Language, and in the Origin and Growth of the English Language.

There are also courses in Psychology, International and Constitutional Law, Political Economy and Christian Evidence.

The study of English Literature is continued from the common course, with readings from the principal English and American authors.

Students who complete the studies of this school will receive the degree of Bachelor of Arts (B. A.,) and that of Master of Arts (M. A.,) in course, after three years of professional study.

SOPHOMORE CLASS—*Second Term.*

History.—The History of England (Hume's Student's). Lectures on American History.

English.—Composition and Declamation. Constitution of the United States. Cutter's Physiology.

Physics.—Mechanics, Heat, Electricity (Statics), and Magnetism.

French.—Fasquelle's French course. Reading: Robinson. Dialogues. Pieces for Recitation.

German.—Otto's German Conversation. Written Exercises. Prepared Conversation. Declamation.

Latin.—Horace. Odes, first Book. Arnold's Latin Prose Composition.

Greek.—Written Exercises. Felton's Greek Historians, continued.

JUNIOR CLASS—*First Term.*

English.—Lectures on the Science of Language: Müller and Farrar. Lectures on the Origin, Sources, and Growth of the English Language.

Physics.—Galvanism, Optics, and Acoustics.

French.—Fasquelle, Part Second; Syntax, with Written Exercises. Colloquial Exercises. De Lille; Condensed French Construction.

German.—Heyse: Deutsche Schul Grammatik. Composition. Declamation. Conversation.

Latin.—Arnold's Latin Prose, continued. Tacitus: Histories.

Greek.—Arnold's Greek Prose Composition. Homer's Iliad. Scanning.

Second Term.

History.—Lectures on the Philosophy of History. The Constitutional History of the United States.

Physics.—Meteorology and Climatology.

French.—Poitevin: Grammaire Elémentaire (in French). Written Exercises. Declamation. Reading: Choix de Poésie par Jules Ponsard.

German.—Written Exercises. German Grammar (in German) continued. Classical Readings in systematic order: Conversation.

Latin.—Tacitus, continued.

Greek.—Arnold's Greek Prose, continued. Xenophon's Memorabilia of Socrates.

Mechanics.—Peck's.

SENIOR CLASS—*First Term.*

Psychology.—Lectures by the President.

History.—History of France (in French). International Law: Lectures.

French.—Poitevin: Grammaire Elémentaire, Syntax (in French). Composition: Conversation. Classical Readings in systematic order.

German.—The study of German will be continued in the Senior Year, by a course of German Literature and Classical Readings, given in German by the Instructor.

Latin.—Selections from the Satires and Epistles of Horace. Latin Metres.

Greek.—Demosthenes: Olynthiacs and Phillippics.

Astronomy.—Loomis' Descriptive Astronomy.

Second Term.

Christian Evidences.—Lectures by the President.

Anatomy and Physiology.—Lectures, with Diagrams.

Political Economy.—Lectures.

French.—Systematic Readings. Composition. Lectures on French Literature (in French).

German.—As above.

Latin.—Cicero's Oration "Pro Cluentio."

Greek.—Demosthenes' "De Corona."

NOTE.—During the Senior Year, Italian and Spanish are elective studies, and may be substituted for Latin and Greek.

II. THE SCHOOL OF CIVIL (OR STATICAL) ENGINEERING.

The general scope of this School comprises the higher branches of the applied mechanics and mathematics, together with the principles of construction and exercises in mapping, drawing and designing. Thus the student is made acquainted with the Theory of Elasticity or Flexure, including the strength of materials, the principles of construction of roof-trusses, beams, girders and bridges as well as the practical designing of such structures, including the determination of their proper dimensions and the preparation of working drawings. Under this head belongs also the Theory of the Stability of Structures, including the theory of the arch and the construction of retaining walls; together with the

theory of motion as applied to machines, the principles of Hydraulics with their applications to water pressure engines, overshot, undershot and breast wheels, turbines, etc.

In all cases practical examples, such as occur in actual engineering practice, are taken up and discussed, and, together with the analytical or algebraic methods, the student is also instructed in practical graphical solutions of the various problems, wherever such solutions present a special value in practice. Much time is devoted to geodetical operations, and to actual practice and instruction in the field. Profiles, Plans of Trigonometrical Surveys, Contour Maps and Town Surveys are made. Instruction is given in the practical operations connected with the reconnoisance, location and surveys of roads, canals and railroads, such as cross sectioning, setting grade stakes, staking out property lines, and calculation of excavation and embankment. Thorough instruction is given in drawing, the construction of working drawings of structures, the designing of bridges and roofs, topography and hydrographical charts.

Attention is also paid to the *application* of the general principles of the science of Engineering, or to Engineering considered as an *art*. Under this latter head may be classed the composition and qualities of materials used in construction, iron, steel, wood, stone; their dressing and preservation; foundations, earth and rock work; harbor and river improvements, drainage, collection and distribution of water, grading, paving, etc.

So much of Mechanical Engineering is necessarily included, as refers to the actual construction of bridges, canal locks, and the special machinery and appliances used in the erection of structures.

Designs for, and reviews of, special structures, specifications and estimates of quantities and cost, and the preparation of a graduation thesis giving evidence of satisfactory attainments, complete the course. To this School is also assigned instruction in Architecture and its applications. The graduate in this School will receive the degree of C. E. (Civil Engineer).

SCHOOL OF STATICAL ENGINEERING—SOPHOMORE CLASS—*Second Term.*

Mathematics.—Analytical Geometry.

Physics.—Heat, Electricity and Magnetism.

French.—Same as in School of General Literature. French

Composition, and a course to enable the student to read the scientific French works used in the different Schools of the University. Declamation in French.

Descriptive Geometry.—Warped Surfaces; Shades and Shadows; Linear Perspective; Theory and Practice.

Drawing.—Elementary Topographical Drawing: Maps of Farm Surveys.

JUNIOR CLASS—*First Term.*

Mathematics.—Differential Calculus.

Physics.—Galvanism, Optics and Acoustics.

Mineralogy and Geology.—Dana's; with the use of Museum.

French and German.—Throughout the term.

Geodesy.—Use and Adjustment of Field Instruments; Leveling; Triangulation; Topographical Surveying; Surveying with Stadia; Hydrography—Theory and Practice; Town Surveying; Plane Table Surveying; Mine Surveying—Theory and Practice.

Topographical Drawing.—Profiles; Plans of Trigonometrical Surveys; Contour Maps; Elements of Machine Drawing.

Second Term.

Mathematics.—Integral Calculus.

Mechanics.—Weisbach's. Mathematical Theory of Motion; Science of Motion in General; Statics; Dynamics and Equilibrium of Bodies; Theory of Centre of Gravity and Moment of Inertia, and Statics of Fluids.

Physics.—Meteorology and Climatology.

Stereotomy.—Cinematics; Elements of Machine Drawing; Drawings of Structures; Working Drawings.

Geology.—Technical Geology.

Theory of Strains.—Stoney.

French and German.—Throughout the term.

Topographical Drawing.—Colored Topography; Hydrographical Charts; Plans and Profiles of Mines; Town Maps; Maps of Landscape Designs and Surveys.

SENIOR CLASS—*First Term.*

Applied Mechanics.—Theory of Flexure; Elasticity and Strength of Materials, including Forms of Uniform Strength; Stability of Structures; Theory of the Arch; Retaining Walls; Ele-

mentary Machines; Elements of Graphical Statics, (Du Bois); Graphical Solutions of Statical Problems.

Psychology.—Lectures by the President.

Astronomy.—Same as in School of General Literature.

Stereotomy.—Stone Cutting; Working Drawings.

Geodesy.—Theory of Reconnoissance; Preliminary and Location Surveys of Roads, Railroads, Canals; Henck's Field Book for Railroad Engineers; Preliminary Field Practice in Staking out Curves, Sidings, etc.; Leveling with the Barometer; Field Work of the Preliminary Survey; Field Work of the Location; Comparison of Lines; Cross Sectioning; Setting Grade Stakes; Staking out Property Lines and Setting out for Construction; Calculation of Excavation and Embankment.

Second Term.

Applied Mechanics.—Theory of Trussed Frames; Bridges and Roofs; General Theory of Machines; Principles of Thermodynamics and Theory of the Steam Engine; Hydraulics and Hydraulic Motors.

Constructions.—Materials of Structures; Dressing and Preservation of Materials; Foundations, Roofs, Bridges and Culverts; Construction of Roads, Railroads, Canals and Tunnels; Earth and Rock Work in General; Harbor and River Improvements; Farm and Town Drainage; Collection and Distribution of Water; Warming and Ventilation; Estimates of Quantities and Cost; Specifications; Designs for and Reviews of Special Structures.

Christian Evidences.—Lectures by the President.

International Law.—Lectures.

Architecture.—Lectures.

Astronomy.—Practical Astronomy, as applied to Geodetic Surveys.

Chemistry.—Chemistry of Building Materials; Lectures.

Topographical Drawing.—Plan and Profile of Preliminary Survey; Map and Profile of Location; Property Maps; Drawing Illustrative of Final Estimates.

III. THE SCHOOL OF MECHANICAL (OR DYNAMICAL) ENGINEERING.

While the problems which the Civil Engineer is called upon to solve are mainly *statical* problems, involving the idea of rest or

equilibrium,and the ends to be obtained in his constructions are stiffness, rigidity and immobility; the object of the Mechanical, or, more properly, Dynamical Engineer, on the other hand, is not to avoid or prevent, but to *produce* motion, not to oppose the action of the forces of nature, but so to guide and use them as to obtain the desired results in the best manner and with the least expenditure of force and material. The two sciences are thus, in the nature of the problems with which they have to do, to a certain extent antithetical. The sciences, however, of which both make use, and the fundamental principles, by the application of which the desired results are in each case obtained, are, to a considerable extent, identical.

Thus the higher branches of the mathematics and applied mechanics, as well as the principles of constructions, are common to both Schools. So, also, as regards the Theory of Elasticity or Flexure and the Strength and Properties of Materials. Much, therefore, of the course as already indicated for the School of Civil Engineering, finds here also a place, as will appear from an examination of the more detailed course of study which is elsewhere given.

In the practical *application* of the principles common to both, however, the two Schools diverge. Thus special attention is directed to the applications of the principles of mechanics to machinery, in the construction of stationary, locomotive and marine engines, hydraulic motors of various kinds, blast furnaces and their appurtenances, foundries, rolling mills and steel works. Information is afforded of the method of casting and working in iron and other metals, and of making and using all tools employed in these processes; in the construction and operation of various manufactories, water works and gas works, and in the proper methods of warming and ventilating.

Much attention is paid to the execution of working drawings and to the analysis and synthesis of machinery. Steps are being taken to secure copies of the working drawings of all existing machinery of special excellence, either of design or execution, and no effort will be spared to have the most advanced improvements in machinery brought to the notice of students as soon as they appear.

The proximity of numerous blast furnaces, rolling mills, foundries, machine shops and factories, enables the student to see the practical working of such establishments and to obtain valuable

practical information in the various branches of mechanical engineering.

Visits of inspection to the workshops, mills and blast furnaces in the neighborhood, with explanations of the machinery and tools used, form an important feature of the course, and will have particular attention.

The graduate in this School will receive the degree of M. E. (Mechanical Engineer.)

THE SCHOOL OF MECHANICAL (OR DYNAMICAL) ENGINEERING.

SOPHOMORE CLASS—*Second Term.*

Same as in School of Civil Engineering.

JUNIOR CLASS—*First Term.*

Mathematics.—Same as in School of Civil Engineering.

Physics.—Same as in School of Civil Engineering.

Mineralogy and Geology.—As in School of Civil Engineering, with special extension of the former.

Metallurgy.—General Metallurgy—As in School of Mining Engineering.

Stereotomy.—Warren's Machine Drawing, Theory and Plates; Sketches and Working Drawings of Parts of Machinery.

French and German.—Throughout the Term.

Practical Mechanism.—Lectures in the Workshop; Hand Tools and Appliances.

Second Term.

Mechanics.—As in Civil Engineering.

Physics.—As in Civil Engineering.

Mineralogy and Geology.—Economic Geology.

Metallurgy.—Special Metallurgy—As in School of Mining Engineering.

Stereotomy.—Cinematics; Sketches of Complete Machines; Finished and Working Drawings of Simple Machines.

French and German.—Throughout the Term.

Practical Mechanism.—Lectures in the Workshop; Machine Tools; Planing; Turning, etc.

SENIOR CLASS—*First Term.*

Applied Mechanics.—As in Civil Engineering.

Astronomy.—Descriptive Astronomy; Attendance in the Observatory.

Machine Drawing.—Finished and Working Plans of Castings; Designs for Castings; Construction of Machines from Actual Measurements in the Shops.

Psychology.—Lectures by the President.

International Law.—Lectures.

Practical Mechanism.—Lectures on Forging, Riveting, Pattern Making and Moulding, with Practice in the Workshop; Link and Valve Motion; Theory of Gearing.

Second Term.

Applied Mechanics.—Theory of Flexure: Elasticity and Strength of Materials, including Forms of Uniform Strength; Stability of Structures; Theory of the Arch; Retaining Walls; Elementary Machines; Elements of Graphical Statics (Du Bois); Graphical Solution of Statical Problems.

Machines.—Hydraulic Engines; The Principles of Thermodynamics; Steam Engines; Air Engines; Boilers, their Construction, Strength and Safety; Construction of Furnaces; Foundry, Machine Shop, Rolling Mill, and Bessemer Plants; Special Machines; Designs for and Reviews of Special Machines.

Christian Evidences.—Lectures by the President.

Chemistry.—Applied to the Arts. Lectures.

Practical Mechanism.—Setting up and Fitting; with practice in the workshop.

Machine Drawing.—Finished and Working Drawings of Special Machines.

IV. THE CHOOL OF MINING AND METALLURGY.

The full course in this school comprises, besides the mathematical, physical, chemical and literary studies necessary to all technical education, courses in Mining, Metallurgy, Geology, Mineralogy, Machines, qualitative and quantitative Analysis, Assaying, Blow-pipe Analysis, Topographical and Mining Surveying and Drawing. On account of the great number and scope of the studies necessary to the completion of the full course, it is four years and a half in length.

The graduate in this School, who has taken the full course, will receive the degree of E. M. (Engineer of Mines).

A partial course may be taken in this School by those who wish to pursue the study of Metallurgy. The course of Metallurgy includes the studies of the full course, except those of Mining and Surveying. More time is devoted to Chemical Analysis and Machines than in the full course. The length of the course is four years.

The graduate of this school in the Metallurgical course will receive the degree of Metallurgist. (Metallt.)

A post graduate course has been arranged in this School, comprising courses in Mining, Metallurgy, Chemical Analysis and Blow-pipe Analysis, with supplemental courses in Geology and Mineralogy. Graduates in the School of Civil Engineering, by remaining one year and taking this course, may obtain the degree of E. M.

In the courses of Mineralogy, Geology and Analytical Chemistry, much attention is paid to the practical instruction of the student in determining minerals by their crystallographic and other physical properties, and by the aid of blow-pipe analysis; in the determination of rocks; in the qualitative and quantitative examination of ores and metallurgical products, and in the rapid methods of assaying ores by the dry and wet ways, employed in metallurgical laboratories. The vicinity of the iron works of the Lehigh Valley and especially of the works of the Bethlehem Iron Company, with its blast furnaces, foundry and machine shops, and Bessemer, puddle, iron and steel rail mills, affords unusual facilities for the practical study of iron metallurgy. The processes of the manufacture of spelter and oxide of zinc may be studied at the works of the Lehigh Zinc Company. The facilities for the practical study of mining and economic geology are hardly less great. The mines of the Lehigh Zinc Company and the brown hematite and slate deposits of the Lehigh Valley are in the immediate vicinity, while within easy reach by rail are the anthracite coal fields of Pennsylvania, the iron and zinc mines of New Jersey, and the celebrated iron mines at Cornwall, Pa.

THE SCHOOL OF MINING AND METALLURGY.

SOPHOMORE CLASS—*Second Term.*

Analytical Geometry,
Physics,
French,
German,
} as in School of Civil Engineering.

Drawing.—Colored Topography; Conventional Tints and Signs; Structure Drawing.

Blow-pipe Analysis.—Practice.

JUNIOR CLASS—*First Term.*

Mathematics,
Physics,
French,
German,
} as in School of Civil Engineering.

Crystallography.—Lectures with Practical Exercises in the Determination of Models.

Chemistry.—Quantitative Analysis.

Drawing.—Machine Drawing.

Second Term.

Mechanics,
Physics,
German,
} as in School of Civil Engineering.

Metallurgy —Metallurgical Processes; Furnaces; Refractory Building Materials; Combustion; Natural and Artificial Fuels; Metallurgy of Iron.

Mineralogy.—Descriptive Mineralogy, with Practical Exercises in the Determination of Minerals.

Chemistry.—Assaying. Quantitative Analysis.

Blow-pipe Analysis.—Practice.

Drawing.—Machine Drawing.

SENIOR CLASS—*First Term*

Applied Mechanics.—As in School of Civil Engineering.

Geology.—Lithology, with Practical Exercises in the Determination of Rocks.

Metallurgy of Zinc, Tin, Copper, Lead, Silver, Gold, &c.

Geodesy.—Use and Adjustment of Field Instrument; Level-

ing; Triangulation; Topographical Surveying; Surveying with Stadia.

Drawing.—Contour Map.

Psychology.—Lectures by the President.

International Law.—Lectures.

Second Term.

Mining.—Modes of Occurrence of the Useful Minerals; Exploration for Mineral Deposits; Examination of Mining Properties; Boring; Mining Tools, Machines and Processes; Timbering and Masonry; Methods of Exploitation.

Geology.—Historic, Dynamic and Economic Geology.

Geodesy.—Plane Table and Mine Surveying.

Drawing.—Maps of Surveys.

Machines.—Theory of the Steam Engine.

Chemistry.—Quantitative Analysis.

Christian Evidences.—Lectures by the President.

FIFTH YEAR—*First Term.*

Mining.—Transportation; Hoisting; Drainage and Pumping; Ventilation; Lighting, &c.; Mechanical Preparation of Ores; Coal Washing.

Chemistry—Quantitative Analysis.

Machines.—Theory of Machines.

Astronomy.—Descriptive Astronomy.

V. SCHOOL OF MINING AND METALLURGY—(METALLURGICAL COURSE.)

SECOND CLASS—*Second Term.*

Analytical Geometry, *Physics*, *French*, *German*, *Blow-pipe Analysis*, *Drawing*, } as in full course.

Chemistry—Quantitative Analysis.

JUNIOR CLASS—*First Term.*

Mathematics, *French German*, *Physics*, *Crystallography*, *Chemistry*, *Drawing*, } as in full course.

JUNIOR CLASS—*Second Term.*

Mechanics,
Physics,
German,
Metallurgy,
Mineralogy,
Chemistry,
Blow-pipe Analysis,
Drawing,
} as in full course.

SENIOR CLASS—*First Term.*

Geology,
Applied Mechanics,
Machines,
} as in full course.

Psychology.—Lectures by the President.

International Law.—Lectures.

Chemistry.—Quantitative Analysis.

Drawing.—Machine Drawing. Details of Metallurgical Apparatus.

Second Term.

Geology.—Historic, Dynamic and Economic Geology.

Machines.—Theory of the Steam Engine; Machines.

Drawing.—Finished and Working Drawings of Metallurgical Plant.

Chemistry.—Quantitative Analysis; Volumetric Analysis.

Christian Evidences.—Lectures by the President.

SCHOOL OF MINING AND METALLURGY.

(POSTGRADUATE COURSE FOR CIVIL ENGINEERS.)

First Term.

Metallurgy of Zinc, Tin, Copper, Lead, Silver, Gold, &c.

Mining.—As in full course of Mining and Metallurgy.

Chemistry.—Quantitative Analysis.

Second Term.

Mining.—As in the second term of the senior year in the full course.

Metallurgy.—Supplemental course in Iron Metallurgy.

Geology.—Supplemental course in Historic Geology; Economic Geology.

Mineralogy.—Supplemental course in Descriptive and Determinative Mineralogy.

Blow-pipe Analysis.

Chemistry.—Quantitative Analysis; Assaying; Volumetric Analysis.

VI. THE SCHOOL OF CHEMISTRY.

The course of instruction in this school continues the subject of theoretical Chemistry from the general course of the two previous terms, the subjects of Chemical Philosophy and Organic Chemistry being taught by daily recitations until the close of the Junior year.

In Analytical Chemistry, the course of Quantitative Analysis in the first term of the second year is followed by preparation of Chemical Compounds and the Purification of Chemicals. Subsequently Quantitative Analysis is pursued to the end of the course, including the Dry Assaying of Ores of Gold, Silver, Copper, Lead, Iron and Tin, and the Wet Analyses, included in the appended schedule. In addition, courses of lectures on Medical, Agricultural and Technical Chemistry are given and various industrial establishments in the neighborhood and in Philadelphia are visited in the company of an instructor. The course also includes thorough instruction in Physics and Mechanics, Mineralogy and Blow-pipe Analysis, Metallurgy, Geology and Descriptive Astronomy, together with courses of lectures on Psychology, Christian Evidences and International Law.

The last term of the Senior year is mainly devoted to the preparation of a thesis on some subject, selected by the Professor, involving practical work in the Laboratory, in addition to the literary labor, and each graduate will thus make a contribution to the progress of the science, as a preliminary to the reception of his degree.

The course is thus seen to include thorough instruction in theoretical and applied Chemistry, in their various branches, as well as in those cognate and other sciences of such great value to the chemist.

The Laboratories are under the immediate charge of the Professor and his Assistant, and, together with the lecture room, are unsurpassed in excellence by any similar establishment in the country, being supplied with all the modern improvements. The

collections of apparatus, specimens and models, illustrating theoretical and applied Chemistry, are already important and rapidly increasing.

Students are charged for the chemicals and apparatus consumed. If the student is moderately careful, this expense need not exceed $50 per year.

The graduate in this school will receive the degree of A. C. (Analytical Chemist.)

SCHOOL OF CHEMISTRY.—SOPHOMORE CLASS.—*Second Term.*

Physics, French and German.—Same as School of Civil Engineering, omitting Drawing and Analytical Geometry.

Chemical Preparations.—Including the Preparation of Chemical Compounds and the Purification of Chemicals by Distillation, Sublimation, Fusion, Crystallization, Precipitation, etc. Blow-pipe Analysis.

Assaying.—Including the Assay by the Dry Methods of Gold, Silver, Copper, Lead, Iron, and Tin Ores.

JUNIOR CLASS.—*First Term.*

Physics.—Same as in School of Engineering.

Astronomy.—Same as in School of General Literature.

Crystallography.

CHEMISTRY.

Chemical Philosophy.—Cooke's Chemical Philosophy.

Toxicology.—Otto on Poisons.

Quantitative Analysis.—Fresenius' Quantitative Analysis. The following Analyses are executed by the Students:

1. Iron Wire (Fe.)
2. Potassic Dichromate (Cr_2O_3.)
3. Baric Chloride (Ba. Cl H_2O.)
4. Magnesic Sulphate (MgO. SO_3. H_2O.)
5. Hydro Di-Sodic Phosphate (P_2O_5.)
6. Bronze (Cu. Sn. Zn.)
7. Rochelle Salt ($K_2O.Na_2O$.)
8. Volumetric Determination of Chlorine.
9. Acidimetry (HCl. H_2SO_4. HNO_3.)
10. Alkalimetry (KOH. $NaOH$. NH_4OH.)
11. Chlorimetry (Bleaching Powders.)

12. Silver Coin (Au. Ag. Pb. Cu.)
13. Zinc Ore (Zn)

Second Term.

Mechanics.—Peck.
Physics.—Same as in School of Civil Engineering.
Mineralogy.
Metallurgy.

CHEMISTRY.

Quantitative Analysis.—Fresenius' Quantitative Analyses. The following Analyses are executed by the students:

14. Copper Ore (Cu.)
15. Spiegeleisen (Mn.)
16. Lead Ore (Pb. S.)
17. Ilmenite (TiO_2.)
18. Iron Ore (Complete Analysis.)
19. Limestone (Complete Analysis.)
20. Coal (Volatile Matter,—Fixed Carbon, Ash, H_2O, S., P.)
21. Slag (Complete Analysis.)

Chemical Philosophy.—Cooke's Chemical Philosophy.

SENIOR CLASS—*First Term.*

Geology.—Dana's.
Psychology.—Lectures by the President.
International Law.—Lectures.

CHEMISTRY.

Quantitative Analysis.—Fresenius' Quantitative Analysis. The following Analyses are executed by the students:

22. Guano (NH_3., P_2O_5. H_2O.)
23. Clay (Complete Analysis.)
24. Manganese Ore (MnO_2)
25. Mineral Water (Complete Analysis.)
26. Pig Iron (Complete Analysis.)
27. Nickel Ore (Ni.)
28. Organic Analysis (C. H. O. N.)
29. Gas Analysis (Complete Analysis of Illuminating Gas.)

Organic Chemistry.—Wöhler's Organic Chemistry.

Second Term.

Geology.—Dana's.
Chemistry Applied to the Arts.—Lectures.
Medical Chemistry.—Lectures.
Agricultural Chemistry.—Lectures.
Christian Evidences.---Lectures by the President.
Preparation of Thesis.

THE CHEMICAL AND NATURAL HISTORY SOCIETY OF THE LEHIGH UNIVERSITY.

This Society was organized in the Fall of 1871, as "The Chemical Society," but was afterwards expanded, as its present title indicates, and admits, by election, students from all departments of the University. The reading room is well supplied with scientific periodicals, including eighteen of the principal English and American journals.

The collections of Chemical Preparations, and of Botanical and Zoölogical Specimens belonging to the Society are already important. During the past years persons have been sent to Texas and Brazil to collect specimens for these cabinets.

The Society has organized and maintained an annual course of public scientific lectures; during the Winter of 1874-5, the fourth course embraced the following:

"The Deep-lying Placers of California," by Prof. Benjamin Silliman, of New Haven, Conn.

"Polarization of Light," by Prof. George F. Barker, of Philadelphia.

"Curiosities of Insect Life," by Prof. Edward S. Morse, of Salem, Mass

"Artificial Illumination," by Prof. William H. Chandler.

The annual oration before the Society was delivered June 22, 1875, by Prof. J. P. Kimball, on "The Development of the Lehigh Anthracite Trade."

Among the honorary members of the Society are more than

one hundred of the most distinguished scientists in Europe and the United States.

PROGRAMME OF STUDIES.

SHOWING THE NUMBER OF HOURS AND EXERCISES PER WEEK DEVOTED TO EACH SUBJECT.

In the following Programme of Studies the number of Exercises per week in each subject is indicated by the figure in parenthesis immediately following.

Two hours of Drawing, three of work in the laboratory, or three of practice in the field are regarded as equivalent to a recitation or lecture of one hour's duration.

GENERAL COURSE.

FRESHMAN CLASS—*First Term.*

Geometry and Mensuration (5), History (3), Essays (1), German (4), Lectures on Chemical Physics (2), Elementary Drawing and Use of Instruments (3).

Second Term.

Algebra and Trigonometry (5), Rhetoric and Logic (2), Essays (1), Chemistry (Lectures) (3), German (2), French (2), Drawing (2).

SOPHOMORE CLASS—*First Term.*

Descriptive Geometry (Theory and Plates) (4), English Literature (2), Farm Surveying (Theory and Practice) (2), Chemistry (Lectures) (4), Chemistry (Work in Laboratory) (2), German (2), French (2).

SPECIAL SCHOOLS.

Students who have passed successfully through the General Course, may be admitted into any of the Schools. All other applicants for admission into any of the Schools must pass a satisfactory examination in the subjects included in the General Course.

SCHOOL OF GENERAL LITERATURE.—SOPHOMORE CLASS—*Second Term.*

English Literature (2), Physics (3), History (Text and Lectures) (4), German (2), French (3), Greek (4), Latin (2).

JUNIOR CLASS—*First Term.*

The Science of Language (3), Lectures on the English Language (1), Physics (5), German (3), French (2), Greek (4), Latin (2).

Second Term.

Literature (3), Philosophy of History (Lectures) (2), Mechanics (2), Physics (1), Mineralogy (1), German (3), French (3), Greek (3), Latin (3).

SENIOR CLASS—*First Term.*

Psychology (2), International Law (1), Descriptive Astronomy (3), Geology (2), German (2), French (2), Greek (2), Latin (2).

Second Term.

Christian Evidences (1), Political Economy (1), Physiology (1), Geology (2), German (2), French (2), Greek (2), Latin (3).

NOTE.—In the Senior Class Latin and Greek are elective studies, and the alternates are Italian and Spanish.

SCHOOL OF CIVIL ENGINEERING.—SOPHOMORE CLASS—*Second Term.*

Analytical Geometry (Cartesian and Abridged Notation) (4), Physics (3), German (2), French (3), Topographical Drawing and Map of Farm Survey (2), Descriptive Geometry (Theory and Plates (6).

JUNIOR CLASS—*First Term.*

Adjustments of Instruments and Field Work (Theory and Practice) (3), Differential and Integral Calculus (4), Physics (5), French and German (2), Crystallography (Theory and Practice) (2), Drawing (Contour Map) (1), Elements of Machine Drawing (2).

Second Term.

Integral Calculus (2), Mechanics (4), Physics (1), Mineralogy (Theory and Practice) (3), Metallurgy (2), German (1), Drawing (Hydrographical and Town Maps) (2), Structure and Machine Drawing (2), Theory of Strains (2).

SENIOR CLASS—*First Term.*

Applied Mechanics (5), Stone Cutting (Theory and Plates)

(2), Psychology (2). International Law (1), Descriptive Astronomy (3). Geology (3), Theory of Machines (1). Machine Drawing (2), Graphical Statics (2), Geodesy (4).

Second Term.

Steam Engine (2), Applied Mechanics and Constructions (5), Christian Evidences (1). Road Engineering and Descriptive Constructions (2). Railroad Surveying and Map (2), Geology (2), Lectures on Architecture (1). Practical Astronomy (2).

NOTE.—By taking an additional year, graduates in the School of Civil Engineering may take the degreee of Mining Engineer also, by going successfully through the following course:

FIRST TERM.

Metallurgy (4), Mining (4), Laboratory work (8).

Second Term.

Metallurgy (1), Mining (3), Geology (1), Economic Geology, (1). Blow-pipe (2), Laboratory work (5), Mineralogy (1).

SCHOOL OF MECHANICAL ENGINEERING—SOPHOMORE CLASS.—*Second Term.*

Analytical Geometry (Cartesian and Abridged Notation) (4), Physics (3), French (3), German (2), Blow-pipe Analysis (1), Machine Drawing (3).

JUNIOR CLASS.—*First Term.*

Differential and Integral Calculus (4), Physics (5), French (1), German (1), Crystallography (Theory and Practice) (2), Theory of Mechanism (1), Shop Lectures (1), Machine Drawing (2),

Second Term.

Mechanics (4), Physics (1). Mineralogy (Theory and Practice) (3), Metallurgy (3), German (1), Theory of Mechanism (1), Shop Lectures (1), Machine Drawing (3).

SENIOR CLASS.—*First Term.*

Applied Mechanics (5) Psychology (2), International Law (1), Descriptive Astronomy (3), Geology (3), Theory of Mechanism (1), Theory of Machines (2), Shop Lectures (1), Machine Drawing (1).

Second Term.

Theory of Steam Engine (2), Machines (5), Geology (2)

Theory of Mechanism (2), Shop Work (1), Machine Drawing (3), Christian Evidences (1).

SCHOOL OF MINING AND METALLURGY.—SOPHOMORE CLASS.—*Second Term.*

Analytical Geometry (4), Physics (3), German (2), French (3), Blow-pipe (1), Colored Topography and Drawing (3).

JUNIOR CLASS.—*First Term.*

Differential and Integral Calculus (4), Physics (5), French and German (2), Crystallography (Theory and Practice) (2), Laboratory work (2), Machine Drawing (1).

Second Term.

Mechanics (4), Physics (1), Mineralogy (3), Metallurgy (3), German (1), Blow-pipe (1), Laboratory work (3), Machine Drawing (1).

SENIOR CLASS.—*First Term.*

Applied Mechanics (5), Geology (3), Psychology (2), International Law, (1) Metallurgy (4), Theory of Adjustments and Engineering Field Work (with practice) (3), Drawing (Contour Map) (1).

Second Term.

Mining (3), Geology (3), Plane Table and Mine Surveying (Theory and Practice) (2), Economic Geology (1), Laboratory Work (3), Steam Engine (2), Drawing (2), Christian Evidences (1).

FIFTH YEAR.—*First Term.*

Mining (4), Descriptive Astronomy (3), Theory of Machines (2), Laboratory Work (3)

SCHOOL OF CHEMISTRY.—SOPHOMORE CLASS—*Second Term.*

Physics (3), German (2), French (3), Pharmaceutical Chemistry (Laboratory) (2), Assaying (Laboratory) (3), Blow-pipe Analysis (1), Drawing (Technical) (1).

JUNIOR CLASS.—*First Term.*

Physics (5), Descriptive Astronomy (3), Crystallography (Theory and Practice) 2), Chemical Philosophy (5), Quantitative Analysis (Laboratory) (5).

Second Term.

Mechanics (2), Physics (1), Mineralogy (Theory and Practice) (3), Metallurgy (2), Blow-pipe Analysis (1), Chemical Philosophy (5), Quantitative Analysis (5.)

SENIOR CLASS—*First Term.*

Psychology (2), Geology (3), Organic Chemistry (3), Quantitative Analysis (Laboratory) (10), International Law (1).

Second Term.

Geology (3), Medical Chemistry (1), Agricultural Chemistry (1), Chemistry Applied to the Arts (3), Christian Evidences (1).

SCHOOL OF ANALYTICAL CHEMISTRY.—SOPHOMORE CLASS.—*Second Term.*

Physics (3), German (2), French (3), Pharmaceutical Chemistry (Laboratory) (2), Assaying (Laboratory) (3), Blow-pipe Analysis (1), Drawing (Technical) (1).

JUNIOR CLASS.—*First Term.*

Physics (5), French and German (2), Crystallography (Theory and Practice) (2), Chemical Philosophy (5), Quantitative Analysis (Laboratory) (5).

Second Term.

Mechanics (2), Physics (1), Mineralogy (Theory and Practice) (3), Metallurgy (2), German (1), Blow-pipe Analysis (1), Chemical Philosophy (5), Quantitative Analysis (5).

SENIOR CLASS.—*First Term.*

Psychology (2), International Law (1), Descriptive Astronomy (3).Geology (3), Organic Chemistry (3), Quantitative Analysis (Laboratory) (10).

Second Term.

Geology (3), Medical Chemistry (1), Agricultural Chemistry (1), Chemistry applied to the Arts (3), Christian Evidences (1).

COURSE IN METALLURGY.—SOPHOMORE CLASS—*Second Term.*

Analytic Geometry (4), Physics (3), German (2), French (3), Blow-pipe (1), Laboratory Work (2), Drawing (1).

JUNIOR CLASS.—*First Term.*

Differential and Integral Calculus (4), Physics (5), French and German (2), Crystallography (Theory and Practice) (2), Laboratory Work (3), Machine Drawing (1).

Second Term.

Mechanics (4), Physics (1), Mineralogy (3), Metallurgy (3), German (1), Blow-pipe (1), Laboratory Work (3).

SENIOR CLASS.—*First Term.*

Applied Mechanics (5), Geology (3), Psychology (2), Metallurgy (4), Laboratory Work (3), Theory of Machines (1), Drawing (1), International Law (1).

Second Term.

Geology (2), Economic Geology (1). Steam Engine (2), Machines (2), Laboratory Work (3), Drawing (2), Christian Evidences (1).

NOTE.—In the foregoing programme of studies an allowance of time has been made in the last term in each School for the preparation of Theses.

THE ENGINEERING SOCIETY.

This Society, established and organized in February, 1873, under the auspices of the then Professor of Engineering, is designed especially for the benefit of students in Civil, Mechanical, and Mining Engineering.

In its collection of photographs and details, Mechanical Engineering is well represented by Locomotives, Machines and Tools, Civil Engineering by Bridges, Aquaducts, &c., while the section of Mining and Metallurgy is designed to be completely illustrated by mining and metallurgical plant. Meetings are held twice a month, when subjects on Engineering and other scientific topics are discussed.

GRADUATING ESSAYS.

Every student, in each of the Schools, will be required to present a written essay or thesis upon some topic connected with his special school, as a necessary portion of the exercises for his final examination for a diploma. These essays shall be accompanied by drawings and diagrams, when the subject needs such illustration. The originals will be kept by the University, as a part of the student's record, for future reference; but a copy may be retained by the student, and be published, permission being first obtained from the President.

UNIVERSITY-DAY AND EXHIBITIONS.

The day following the close of the Annual Examination shall be known as University Day. Upon this day the "Annual Exhibition of Graduates" shall take place in the presence of the Trustees, Faculty and invited guests. The exercise shall consist of orations by Senior Schoolmen, and an address to the students by the President or some other member of the Faculty. Every student must perform the duty assigned to him, unless excused by the President.

On some other day, annually appointed, the University Oration will be pronounced by some distinguished person invited to do so.

The University Sermon will be preached on the Sunday before University Day, under the direction of the President.

RESIDENT GRADUATES.

A limited number of graduates who desire to pursue their studies under the general direction of the Faculty, may be allowed the use of the Library, and may attend the lectures in any of the departments, during a term of three years, free of expense. Although not bound by University hours, they will be required to obey the directions of the President, and of the Professors in reference to

their departments; will board and lodge only in places sanctioned by the President, and will have their names placed upon the Annual Register.

PRIZE TO BE AWARDED IN 1876.

A gold medal for the best essay in the Second Class. Subject: "*The Lehigh Valley.*" The medal is the gift of CHARLES BRODHEAD, ESQ.

AWARD ON UNIVERSITY-DAY.

The Wilbur Scholarship (value $200) was awarded to Henry S. Jacoby, of the Sophomore Class.

THE UNIVERSITY SERMON

Was preached in the Church of the Nativity, on Sunday, June 7th, by the Rev. Marcus A. Tolman, of Mauch Chunk.

GRADUATING THESES OF THE CLASS OF 1875

Were read on Wednesday morning, June 23d, at 8:30 o'clock, as follows:

IN CIVIL ENGINEERING.

1. Design for Improvements of the Grounds in University Park.
   Chas. J. Bechdoldt.

2. Review of Chemung River Bridge, on Pa. & N. Y. R. R. at Athens, Pa.
   W. A. Lathrop.

3. Review of Foundations of Towanda Bridge, on Pa. & N. Y. R. R. at Towanda, Pa.
   Arthur E. Meaker.

4. Review of Overshot Water Wheel of Burden Iron Works, at Troy, N. Y.
   F. S. Pecke.

5. Review of Compound Engine of the Phœnixville Iron Works, Phœnixville, Pa.

C. F. Zogbaum.

6. A General Discussion of the Laws of Drainage and Sewerage, as applied to Farms and Towns.

Joseph Morrison, Jr.

In General Literature.

1. International Arbitration and Codification.

John G. Halbach.

In Analytical Chemistry.

1. On the Separation of Lanthanum and Didymium from Allanite and the Preparation of their Salts.

Edw. H. Williams, Jr., A. B.

2. On Peruvian Bark, and the Preparation and Estimation of Quinine Therefrom.

Antonio M. Cañadas

STUDENTS.

C E.—Civil Engineering. *M. E.—Mechanical Engineering.*
E. M.—Engineer of Mines. *A. C.—Analytical Chemistry.*
G. L.—General Literature.

POST GRADUATES.

Name.	School.	Address.	Univ. Res.
Wm. D. Hartshorne,	C. E.	Brighton, Md.	Market street.
W. Arthur Lathrop,	C. E.	Springville.	Market street.

SENIOR CLASS.

Frank C. Angle,	C. E.	Danville,	28 Saucon Hall.
Wm. B. Baldy,	C. E.	"	14 Saucon Hall.
Antonio M. Cañadas,	A. C.	Quito, Equador,	New street.
James D. Carson,	C. E	Toledo, Ohio,	Brodhead ave.
Levan Dannenhauer,	A. C.	Allentown,	Allentown.
Thos. W. Frederick,	M. E.	Catasauqua,	Catasauqua.
William Griffith,	C. E.	Pittston,	New street.
Frank Gilman, B. A.,	C. E.	Churchville, N. Y.,	New street.
J. C. de Gama Guimaraes,	M. E.	S. Paulo, Brazil,	Church street.
Frank Johnston,	A. C.	Bethlehem,	Wall street.
Robert W. Mahon,	C. E.	Columbia,	Brodhead ave.
Charles W. Macfarland,	C. E.	Philadelphia,	Market street.
J. J. da Gama Malcher,	M. E.	Para, Brazil,	Church street.
M. Joseph Nowlan,	A. C.	Philadelphia,	New street.
William L. Rader,	C. E.	Wilkesbarre,	New street.
C. W. Edgar Reichel,	C. E.	Bethlehem.	Cedar street.
Walter P. Rice.	C. E.	Cleveland, O.,	New street.
Henry Richards,	E. M.	Dover, N. J.,	Fourth street.
Lowdon W. Richards,	M. E.	Columbia,	Brodhead ave.
A. W. Sterner,	Special.	Bursonville,	Rittersville.
Charles L. Taylor,	E. M	Philadelphia.	Fourth street.
Edw. H. Williams, Jr.,	E. M.	"	30 Saucon Hall

JUNIOR CLASS.

Name.	School.	Address.	Univ. Res.
Thos. G. Budington,	E.M.	Brooklyn, L.I.,	Third street.
T. Frederick Carter,	C. E.	Frankfort, Ky.,	Anth. Build'g.
George G. Converse,	A. C.	Zanesville, O.,	Market street.
John Cox,	A. C.	So. Bethlehem,	Freitag street.
John Eagley,	C. E.	Springfield,	Third street.
Jacob C. A. Fox,	A. C.	Minersville,	Anth. Build'g.
Percival Giess,	C. E.	West Bethlehem,	Broad street.
Andrew M. Glassell,	C. E.	BowlingGreen, Va.	23 Saucon Hall.
George M. Heller,	C. E.	Philadelphia,	24 Saucon Hall.
Henry S. Jacoby,	C. E.	Springtown,	North street.
Joseph P. Lance,	A C.	Norfolk, Va.,	New street.
James F. Marsteller,	C. E.	Seidersville,	Seidersville.
John W. McComas,	C. E.	Cincinnati, O.,	20 Saucon Hall.
S. Miyaharra,	C. E.	Kayoshima, Japan,	12 Saucon Hall.
Frederick D. Owen,	C. E.	Hartford, Conn.,	17 Saucon Hall.
William P. Palmer,	G. L.	Brooklyn, L. I.,	Birch street.
Charles R. Rauch,	A. C.	Bethlehem,	Bethlehem.
Wm. J. Renniman,	A. C.	Scranton,	22 Saucon Hall.
Frederic T. Shultz,	Special.	Bethlehem,	Church street.
Fred. M. Warner,	A. C.	JerseyCity, N J.,	25 Saucon Hall.
Frank Weiss, Jr.,	A. C.	Bethlehem,	Market street.
Lewis T. Wolle,	C. E.	South Bethlehem,	New street.

SOPHOMORE CLASS.

Name.	School.	Address.	Univ. Res.
Lester J. Barr,	C. E.	Erie,	21 Saucon Hall.
Charles Bull,	M. E.	Buffalo, N. Y.,	Fourth street.
Henry M. Byllesby,	M. E.	Allentown,	26 Saucon Hall.
William G. Cochrane, Jr.,	C. E.	Philadelphia,	32 Market st.
M. W. de Mesa,	C. E.	New York,	Market street.
John W. Eckert,	A. C.	Allentown,	Allentown.
Andrew F. Freis,	C. E.	West Point, N. Y.,	31 Saucon Hall.
James E. Gilbert,	C. E.	Winchester, Va.,	27 Saucon Hall.
William S. Hazlett,	M. E.	Zanesville, O.,	Birch street.
George W. D. Hope,	A. C.	Bethlehem,	Main street.
Frank P. Howe,	M. E.	Reading,	13 Saucon Hall.
F. H. Jordao,	C. E.	San Paulo, Brazil,	Church street.
Joseph Lafon,	C. E.	Newark, N. J.,	Brodhead Ave.
Nathaniel Lafon, Jr.,	M. E.	Lexington, Ky.,	24 Saucon Hall.
Howard Lyon,	M. E.	Springfield, N. J.,	Birch street.
J. C. da Gama Malcher,	C. E.	Para, Brazil,	Church street.
Robert S Myers,	M. E.	Hazleton,	Third street.
George A. Nixon,	C. E.	Covington, Ky.,	33 Saucon Hall.
Benj. B. Nostrand, Jr.,	M. E.	Sands Point, N. Y.	6 Saucon Hall
Milnor Paret,	C. E.	Williamsport,	Fourth street.
H. F. J. Porter,	M. E.	Morristown, N. J.,	New street.
William K. Randolph,	C. E.	Evergreen, La ,	Elm street.
Robert H. Reed,	G. L.	Columbia,	Centre street.
Frank Stahr,	Special.	Allentown,	Allentown.
Henry C. Wilson,	C. E.	Brooklyn, L. I.,	Church street.
William S. Winterstein,	A. C.	Bethlehem,	Market street.

FRESHMAN CLASS.

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